DESCRIPTION OF EXPERIMENTAL OPERATIONS UPON GUNSHOT WOUNDS OF THE ABDOMEN.

EXPERIMENT 1.

Aug. 8. Full grown English bull. Weight, 43 lbs. Shot with a S. & W. pistol, .32 calibre. Ball entered at lumbar region, passing obliquely through, coming out on opposite side and burying itself in the table. Laparotomy revealed one non-penetrating and three penetrating wounds of the intestines, and a wound of the kidney. Abdominal cavity filled with blood, which came from the renal wound, but no evidence of fæcal extravasation. The penetrating wounds were closed with Lembert stitches, and nephrectomy practiced for the wounded kidney, the ball having passed through its central portion and completely shattered the organ. The ligature, which was a single one, was hardly applied before it slipped and although it was almost immediately seized there occurred a considerable loss of blood with a telling effect. Clots were removed and the cavity repeatedly flushed with warm Thiersch's solution and closed. Hypodermics of whisky, ammonia and digitalis were given, and, in a condition of profound shock, removed to a warm place. Operation lasted one hour. The animal died in six hours without rallying from shock.

Post-mortem. Eight hours after death. Abdominal cavity clean. Intestines distended with gas. Intestinal wounds sealed with inflammatory exudate. Ligations of renal stump unchanged. Death from shock.

EXPERIMENT 2.

Aug. 15. Medium size mongrel. Weight, 27 lbs. Shot with a flobert, from a Remington rifle. Laparotomy revealed one perforating wound and a wound of the mesenteric artery near its origin from the abdominal aorta, which was not found till after death, the animal dying, just as the abdominal cavity was opened, from hæmorrhage, it being really an unsurgical case.

EXPERIMENT 3.

Aug. 15. Medium size dog. Weight, 28 lbs. Shot with a flobert from a Remington rifle. Laparotomy revealed very slight hæmorrhage and one perforating intestinal wound which was closed with a continuous stitch. No fæcal extravasation. Cavity closed. No shock. Time, 30 minutes.

Aug. 16. Dog escaped from kennel during the night. Drinks freely of milk.

Aug. 28. Dog lively. Stitches removed. Abdominal wound almost entirely healed.

Sept. 3. Perfect recovery. Animal sacrificed to obtain specimen.

Post-mortem. The site of injury was found with difficulty, and showed no scar or infringement upon the intestinal lumen. It was only recognizable from the thread that was hanging from the surface.

EXPERIMENT 4.

Aug. 22. Full-grown mongrel. Weight, 39 lbs. Shot with a .22 long from a Remington rifle, the ball entering 2 inches to the left and below umbilicus, passing straight through coming out on opposite side. Laparotomy revealed a moderate amount of hæmorrhage and fæcal extravasation coming from the intestinal wounds, which numbered 12 perforating and 1 non-perforating. Resection was performed beginning just below the ileocæcal valve and removing over 4 feet of the small intestine including all but three of the intestinal wounds. Of these three, two were perforating and were closed with a continuous suture; the other was non-perforating and left alone. The resection was performed by ligaturing the mesentery *en masse* at its vertebral border. The ends of the intestines were united after the method of Wölfler. The *toilet de peritone* was carefully done and the other layers closed with a continuous suture. Given six minims of Magendie's solution and several hypodermics of whisky and removed to a warm place in a condition of shock. External heat was applied but the animal only partly rallied.

Time, $1^{1}/_{2}$ hours. Was seen again at midnight. Extremities warm, respiration rapid and shallow, pulse feeble and rapid.

Aug. 23. Found dead.

Post-mortem. Cavity contained about 2 ounces of bloody fluid and a few clots. The mesenteric stump was covered with a blood clot. The resection as well as the other wounds were sealed with exudate and retained air sufficiently to resist some pressure and float when ligated and thrown upon water. Rectum filled with hardened fæces. Death from shock.

EXPERIMENT 5.

Aug. 28. Small mongrel. Weight, 18 lbs. Shot with a S. & W. pistol, .22 calibre. Laparotomy revealed the abdominal cavity filled with blood and fæcal extravasation. Five perforating and two non-perforating intestinal wounds and a nick in the free border of spleen. Two of intestinal wounds were large and required the resection of one inch of intestine. The others were closed with Lembert stitches. The non-perforating wounds were broad and shallow and were left untouched. Splenic wound being small was disregarded. The principle source of the hæmorrhage was from two of the intestinal wounds that were situated on the mesenteric edge and involved the vessels in that region. The clots were removed, cavity flushed and closed. Was given $^{1}/_{4}$ grain morphia and alcohol hypodermically and removed to a warm place. The animal being undersize its intestines were small and fragile, all of which served to prolong the operation to $1^{1}/_{2}$ hours. Died 1 hour after removal from table of shock.

Post-mortem. Soon after death. Cavity contained about 1 ounce of bloody fluid and a few clots in the omental folds. Intestinal wounds apparently unchanged.

EXPERIMENT 6.

Aug. 31. Full-grown dog. Weight, 38 lbs. Shot with a S. & W. pistol, .22 calibre. Ball entered 1 inch to the right, and on a level with the umbilicus, passing in an antero-posterior direction causing her to wince, and corrugate the abdominal walls. Laparotomy revealed one non-penetrating and four penetrating wounds of the intestine and a wound of the upper edge of the kidney. The abdominal cavity contained but a few ounces of blood but posteriorly was a very large subserous hæmatoma which communicated with the abdominal cavity by the track of the ball. Fæcal extravasation into the peritoneal cavity. Two of the perforating wounds which were in the ileum and required a resection of one inch of intestine which was done after the method of Wölfler, the others were in the cæcum and were closed with the Lembert stitch. The non-penetrating wound being unattended with hæmorrhage was left alone. Nephrectomy was practiced for the wound of the kidney. The hæmatoma was incised and removed. The cavity flushed with warm Thiersch's solution and closed. The animal was given $^1/_4$ grain morphia hypodermically and 1 ounce of whisky per rectum and removed to a warm place, bearing evidences of considerable shock, from which she reacted sufficiently in a half hour to be crawling about. Time, 1 hour and 20 minutes.

Sept. 1. Drank a few ounces milk in the morning, but died at noon after living 20 hours.

Post mortem. Few hours after death. External wound in good condition. Abdominal cavity free from bloody fluid, but contained a few clots. Intestines somewhat matted together and wounds sealed. Renal stump unchanged. Death from an acute septic peritonitis.

EXPERIMENT 7.

Sept. 7. Full-grown mangy dog. Weight, 32 lbs. Shot with a S. & W. pistol, .22 calibre. Ball entered 1 inch to the right and a little below the umbilicus. Laparotomy revealed a moderate amount of hæmorrhage, and an oozing of liquid fæces. Intestines showed six perforating wounds, one wound to the spleen, and a nick in the free border of the liver. The intestinal wounds were closed with Lembert stitches. The wound of the liver being slight, with the hæmorrhage arrested, was allowed to go untouched. Splenectomy was practiced for the wound of the spleen using a double catgut ligature for its ligation. The cavity was flushed with warm sterilized water and closed. Given $^1/_4$ grain of morphia and several hypodermics of whisky and removed to a warm place bearing evidences of considerable shock from which he rallied sufficiently in a few hours time to be crawling about. Seen at 11 P.M., too weak to stand. Operation lasted 1 hour.

Sept. 9. Drank a few ounces of milk, but still too weak to stand.

Sept. 10. Drinks freely of milk, and appears livelier.

Sept. 11. Runs about, and takes liquid food freely.

Sept. 15. Refuses food and appears sick. Removed from the kennel, which afterwards proved to be infected.

Oct. 6. Animal perfectly recovered Sacrificed to obtain specimen.

Post-mortem. All appearances gave evidence that a general peritonitis had ensued. The lobes of the liver were adherent to each other with a cicatrix at the site of the wound. The intestines were adherent to the abdominal wall and to one another at different places. Splenic stump was not found. All the organs were covered with a perceptible layer of fibrine.

EXPERIMENT 8.

Sept. 15. Full-grown part bull. Weight, 37 lbs. Shot with a S. & W. pistol, .22 calibre. Ball entered 1 inch to left and below the umbilicus and was subsequently found on the opposite side, having made a hole in the opposite wall, but fell back into the abdominal cavity. Laparotomy revealed considerable hæmorrhage but apparently no fæcal extravasation. Intestines received six large and two small perforations. There were two perforations unaccompanied with hæmorrhage in the mesentery and a small nick of the spleen which was left untouched in the treatment on account of its size and the absence of hæmorrhage. The intestinal wounds were closed with Lembert stitches. Of the mesenteric wounds one was closed with a single stitch. The blood was removed, and cavity flushed with warm Thiersch's solution. Cavity closed and given a hypodermic of morphia and a warm rectal injection of saline solution and whisky. Removed to a warm place in a condition of considerable shock from which he slowly reacted with the aid of external heat. Operation lasted 1 hour and 20 minutes. Seen at 11 P.M., reacting slowly.

Sept. 16. Unable to stand, but otherwise lively, and drinks freely of milk.

Sept. 17. Gait slow and unsteady. Takes considerable milk.

Oct. 18. Perfectly recovered. Sacrificed to obtain specimen.

Post-mortem. A most extensive peritonitis had ensued in which all of the intestines were firmly bound together in one mass and were so removed. There were likewise adhesions to the liver and the abdominal wall at the seat of the abdominal section.

EXPERIMENT 9.

Sept. 21. Small sized terrier. Weight, 17 lbs. Shot with a flobert from a S. & W. pistol, the ball entering one inch to the left and one inch and a half below the umbilicus. Laparotomy revealed seven wounds of the intestine and two of the mesentery. The mesenteric wounds were very much lacerated, one of which being in connection with an intestinal wound and attended with hæmorrhage. Considerable hæmorrhage and fæcal extravasation had occurred. The intestinal wounds were closed with Lembert stitches. The wound in the mesentery, which was attended with hæmorrhage, was treated with a ligature; the other was left untouched. The intestines were in sections alternately contracted and dilated, and very fragile. The cavity was flushed with sterilized water, mopped out and closed. Ten minims of Magendie's solution and two drams of whisky were given hypodermically and removed to a warm place in a condition of severe shock. External heat applied, but reaction was very slow and only partial. Because of his small size and old age, he was a very unfit subject. Operation lasted one hour. Death followed in six hours from shock.

Post-mortem. Few hours after death cavity contained a few ounces of bloody fluid. Intestinal wounds agglutinated, excepting the one on the mesenteric border, from which was oozing thick liquid fæces.

EXPERIMENT 10.

Sept. 22. Full grown mongrel. Weight, 29 lbs. Shot with a flobert from a S. & W. pistol, the ball entering 1 inch to the left and on a level with the umbilicus. Laparotomy revealed a moderate amount of hæmorrhage, and, apparently, no fæcal extravasation. The spleen was perforated near its center and the intestines in five places. The splenic wound was treated with a continuous suture on both sides, including upon the inner surface the omentum in the stitch. The intestinal wounds were all small, and closed by Lembert stitches excepting one, which was linear in character, and closed with a running suture in the direction of the long axis of the intestine. Abdominal cavity was flushed, mopped out and closed. Given two drams of whisky hypodermically, and placed aside in slight shock, from which he rallied in an hour's time. Operation lasted half hour.

Sept. 23. Broke from kennel and was found in some high grass some distance away. Refused food.

Sept. 24. Drank a few ounces of milk only.

Sept. 25. Improved. Takes milk freely.

Sept. 30. Apparently recovered.

Oct. 15. Recovered. Killed to obtain specimen.

Post-mortem. Circumscribed peritonitis, extending some distance beyond the original injury. Intestines adherent to the site of the abdominal section, as well as a few adhesions to one another. The injured spots were found with difficulty. Intestinal lumen suffered no infringement, and when split open the sutures were found hanging from the inner surface, ready to be cast off.

EXPERIMENT 11.

Sept. 22. Medium size black spitz. Weight, 26 lbs. Shot with a flobert from a S. & W. pistol. The ball entered 1 inch to the left and a little below the umbilicus. Laparotomy revealed three perforating wounds of the intestine, and only a small amount of hæmorrhage. No fæcal extravasation. Intestinal wounds closed with Lembert stitches. The abdomen closed without flushing. Given ten minims of Magendie's solution and whisky hypodermically. Removed to the kennel without shock. Operation lasted 40 minutes.

Sept. 23. Escaped from kennel with his companion during the night. Refused food in the morning, but drank freely of milk at noon.

Sept. 24. Appears lively and takes considerable milk.

Oct. 15. Recovery. Killed to obtain specimen.

Post-mortem. The only observation of any note was a circumscribed peritonitis at the seat of injury.

EXPERIMENT 12.

Sept. 29. Medium sized mongrel. Weight, 20 lbs. Shot with a S. & W. pistol of .22 calibre, the ball entering on a level with and to the left of the umbilicus. Laparotomy revealed a moderate amount of hæmorrhage and fæcal extravasation; six perforating and one non-perforating intestinal wounds. The intestinal wounds were closed with Lembert stitches. Clots were removed, and the cavity carefully flushed and mopped out. Removed to kennel with evidences of shock. Operation lasted 1 hour.

Sept. 30. Refuses food and appears weak, lying around in a listless manner.

Oct. 1. Improving; takes a small amount of milk; gait unsteady.

Oct. 2. Appears stronger and drinks freely of milk.

Oct, 24. Recovery. Killed to obtain specimen.

Post-mortem. Seat of injury found with difficulty, showing evidence of slight circumscribed peritonitis.

EXPERIMENT 13.

Oct. 5. Liver colored dog. Weight, 41 lbs. Shot with a S. & W. pistol of .22 calibre; the ball entered two inches above and to left of umbilicus. Laparotomy revealed considerable hæmorrhage in the abdominal cavity, and a broad non-perforating wound of the intestine, the ball severing the serosa and muscularis. The spleen presented an oblique perforation, passing upward from the external to the internal surface. The intestinal wound was treated with five Lembert stitches. The splenic wound was closed with a continuous suture on the external surface. The inner surface was treated in a like manner, only including the omentum in the suture. This successfully arrested the hæmorrhage, but the spleen below the suture rapidly increased in size and became cyanosed in appearance. The appearance was so unfavorable that extirpation was resorted to. Splenic stump dusted with iodoform and dropped back; cavity flushed with warm sterilized water and closed; given a hypodermic of ¼ grain morphia and $^1/_{120}$ grain atropine, together with a rectal injection of saline solution, and removed to a warm place in a condition of shock. Operation lasted nearly one hour.

Oct. 6. Walks about and takes food, apparently suffering very little, if any, inconvenience.

Oct. 7. Same.

Nov. 10. Recovered and turned over to the pound keeper, under whose care he was poisoned. In a post-mortem made by himself the bullet was found encysted in the abdominal wall.

EXPERIMENT 14.

Oct. 5. Full grown mongrel. Weight, 40 lbs. Shot with a S. & W. pistol of .22 calibre. The ball entered 1 inch above and to left of umbilicus. Laparotomy revealed two perforating and one non-perforating wound of intestine and a wound of the mesentery. Abdominal cavity contained only a slight amount of blood. Intestinal wounds closed with Lembert stitches. Abdominal cavity closed without flushing. Hypodermic of a ¼ grain morphia and $^1/_{150}$ grain atropine, and removed to his kennel in an excellent condition. No shock; up and walking about in less than an hour. Operation lasted a half hour.

Oct. 6. Lively. Takes milk freely.

Oct. 11. Same.

Oct 20. Recovered, but disappeared

EXPERIMENT 15.

Oct. 6. Full grown dog. Weight, 38 lbs. Shot with a Remington rifle, .22 calibre, using a long shell. Ball entered on a level with the umbilicus, passing in an oblique course downward toward the right, coming out on the opposite side. The abdominal cavity was filled with blood, which principally came from a wound in the border of the spleen The intestinal wounds found ante-mortem were seven in number, and of such size and character that it was plainly evident that the animal was beyond redemption. The splenic wound received the first attention, in the excision of a triangular piece, including the perforation, the edges being united by a running catgut suture, beginning upon the external surface and passing over the free border down the internal surface, which completely arrested the hæmorrhage. In addition there was a perforation through the mesentery, which was treated with a catgut ligature for the same purpose. The first intestinal wound measured fully an inch in length, removing more than two-thirds of the circumference of the gut, leaving only a narrow strip upon the mesenteric border. For this, complete resection was performed, reuniting the ends, after the manner of Wölfler. The next were two large wounds which were treated by a single partial resection. Beyond, some distance, were two more which received a similar treatment, and, lastly, two more very large wounds close together, which were treated by a single resection. The animal being already 1½ hours under operation, and in a condition of shock, no further search was made for additional injury. The clots were removed, and the cavity flushed and closed. Given ½ grain morphia, together with $^1/_{60}$ of a grain atropine, and several hypodermics of whisky, and removed to a warm place, suffering severely from shock. Operation lasted nearly 2 hours. Fæcal extravasation and entozoa. Partly reacted, but after the lapse of three hours began to fail steadily till midnight, when death occurred, after living 6 hours.

Post-mortem, eight hours after death. Cavity contained about one and a half ounces bloody fluid; intestines distended with gas. Intestinal wounds closed and filled with plastic exudate. In addition there were two more perforations in the large intestine at the commencement of the rectum, which was filled with hardened fæces, and notwithstanding this, none escaped. Splenic wound covered with exudate.

EXPERIMENT 16.

Oct. 12. Medium-sized dog. Weight, 22 lbs. Shot with a S. & W. pistol, .22 calibre. The ball entered to the right and above the umbilicus, passing through the abdominal cavity. Laparotomy revealed slight hæmorrhage, fæcal extravasation, and entozoa. One non-penetrating and six penetrating wounds of the intestine, which were of moderate size and principally closed by the continued suture. Abdominal cavity flushed and mopped out. Cavity closed and removed with very little shock, from which he soon rallied. Time, a little over 1/2 hour.

Oct. 13. Somewhat weak but took a few ounces milk toward noon.

Oct. 14. Able to walk about and takes milk.

Acs. 31. Recovered. Killed to obtain the specimen.

Post-mortem. Abdominal wound healed with the sutures encysted. Intestines adherent and bands of lymph thrown across. Slight encroachment upon the intestinal lumen. A loop of silk was found hanging from the interior ready to be cast off. Spontaneous omental grafting occurred in another.

EXPERIMENT 17.

Oct. 17. Medium-sized half bull. Weight, 26 lbs. Shot with a flobert from a Remington rifle, .22 calibre. The first shot, as was shown by a laparotomy, failed to produce an injury to the abdominal viscera. The second shot produced five perforating wounds in the small intestines and three in the cæcum, together with a perforation in the mesentery. The perforating wounds were closed with Lembert stitches and the non-perforating wounds were small and left untouched. The cavity repeatedly flushed and mopped out. Given hypodermics of morphia and atropia. Closed and removed to kennel with very little evidence of shock. Operation lasted nearly an hour, during which there was extensive fæcal extravasation and entozoa.

Oct. 18. Lies about in a drowsy manner, refusing food this morning, but took a few ounces of milk at noon.

Oct. 19. Refuses all food and very apathetic.

Oct. 20. Found dead.

Post-mortem. Few hours after death. Abdominal cavity contained a thick purulent fluid. Intestines matted together. Wounds of the ileocæcal region in an ulcerated condition, some of which were patulous. Death from septic peritonitis.

EXPERIMENT 18.

Oct. 17. Full-grown black mongrel. Weight, 35 lbs. Shot with a Remington rifle, using a .22 short. Ball entered one inch to left and below umbilicus, passing through the abdominal cavity, making its exit on the opposite side. Laparotomy revealed considerable hæmorrhage and fæcal extravasation. Intestine received three large wounds together with a perforation of the spleen. The wounded intestines were drawn out of the abdominal cavity to control the fæcal extravasation. Splenectomy was practiced for the splenic wound. The intestinal wounds were large, one requiring a triangular excision. The others were closed with Lembert stitches. Cavity was repeatedly flushed, mopped out and closed. Removed in a condition of shock to a warm place. Operation lasted 1 hour.

Oct. 18. Drank a few ounces milk in the morning, which he soon vomited. Later in the day he refused all food and appears drowsy.

Oct. 19. Refuses food and appears apathetic.

Oct. 20. Very weak. Refuses food, and appears apathetic. Temperature, 102.2°.

Oct. 21. Temperature, $103^{2}/_{5}$°; otherwise the same. Died late this afternoon.

Post-mortem. Soon after death. Abdominal wound upon pressure discharged a few drops of pus. Abdominal cavity contained about six ounces of reddish yellow pus. Splenic stump adherent to omentum forming a pocket for the accumulation of pus. Intestinal wounds in contact but upon pressure allowed the escape of the contents. Died of septic peritonitis.

Note.—This as well as the one used in the previous experiment was obtained from the dog pound which really is nothing more than a fertilizing works where they are fed upon the bodies of dead animals. From the amount and condition of the contents I believe insufflation would have unquestionably very much increased the quantity of extravasation in both of these.

Experiment 19.

Oct. 18. Full-grown half bull. Weight, 40 lbs. Shot with a S. & W. pistol, .22 calibre. Senn's test was employed and indicated the absence of a perforation of the gastro-intestinal tract. This was corroborated by a laparotomy which revealed a slight hæmorrhage and a non-penetrating wound. The cavity was flushed, mopped out and closed. The intestines remained distended throughout the operation, and were returned with difficulty. In applying the test the wound of entrance was so small that it was only rendered patulous after mutilation. There was no shock, and the animal made an uninterrupted recovery. Soon after recovery he made his escape from the hospital.

Experiment 20.

Oct. 18. Full-grown black bitch. Weight, 50 lbs. Shot with a S. & W. pistol, .22 calibre. Laparotomy revealed the cavity filled with blood. Intestines received three small perforating wounds and a contusion. The animal, which was found to be pregnant with six pups, also received three perforating wounds of the uterus and tubes. The intestinal wounds were closed with Lembert stitches. The pregnant tubes and uterus were ligated in sections and cut away. The cavity was flushed, mopped out, and closed. Given a hypodermic of morphia and whisky and removed. No fæcal extravasation. Operation lasted $1^{1}/_{4}$ hours.

Oct. 19. Appears lively, and drinks freely of milk.

Oct. 20. Same.

Oct. 21. Made his escape but was again found Oct. 26 in a recovered condition.

Experiment 21.

Oct. 29. Medium-sized brindle bull. Weight, 28 lbs. Shot with a S. & W. pistol, .22 calibre. Ball entered one and a half inch above and to the right of the umbilicus. Laparotomy revealed considerable hæmorrhage and fæcal extravasation. Five perforating wounds of the intestines and a wound of the spleen. Splenectomy was practiced for the wound of the spleen, ligating its root in three portions. Intestinal wounds closed with Lembert stitches. Cavity flushed with warm sterilized water and closed. Given a hypodermic of whisky and morphia and removed in a good condition. Operation lasted 1 hour.

Oct. 30. Died at noon, living only 18 hours after the operation.

Post-mortem. Abdominal cavity contained about a pint of bloody fluid and clots. Intestinal wounds sealed and in good condition.

EXPERIMENT 22.

Oct. 29. Full-grown black spitz. Weight, 30 lbs. Shot with a S. & W. pistol, .22 calibre. Ball entered two inches to the right and above umbilicus. Laparotomy revealed slight hæmorrhage, five perforating and two non-perforating intestinal wounds. A wound of the mesentery. The perforating wounds were closed with Lembert stitches. The others were left untouched. Cavity flushed with warm sterilized water, mopped out and closed. Given a half grain morphia and two hypodermics of whisky. Slight fæcal extravasation. Operation lasted 1 hour. In this case Senn's test was attempted, but it was impossible to force the gas beyond the fæcal accumulation. The bag was a five gallon one, and well filled, and such compression used as almost to cause a rupture. Also the exchange of different tubes was practiced but without success.

Oct. 30. Very weak. Refuses food.

Oct. 31. Improved. Took several ounces milk.

Nov. 2. Appears lively and takes food freely.

Nov. 4. Same.

Nov. 8. Recovered, but made his escape from the hospital.

EXPERIMENT 23.

Nov. 2. Medium-sized white dog. Weight, 21 lbs. Shot with a S. & W. pistol, 22 calibre. Ball entered obliquely to left of umbilicus. Laparotomy revealed considerable hæmorrhage, six intestinal, one mesenteric and a wound of the spleen. The mesenteric wound was treated with a ligature to arrest the hæmorrhage. The intestinal wounds were closed with Lembert stitches and splenectomy practiced for the wound of the spleen. Cavity flushed, mopped out and closed. Fæcal extravasation. Operation lasted 1 hour. In this experiment Senn's test was used with the same difficulty and result as in the preceding. The rectum being completely filled with fæcal matter in a soft condition.

Nov. 3. Took a few ounces of milk in the morning but died at noon. Seemed very much annoyed with tenesmus.

Post-mortem. Three hours after death. Abdominal cavity contained a few ounces of bloody fluid. Small intestines alternately contracted. Large intestines completely filled with fæcal matter. Intestinal wounds in fair condition. In addition to those closed, another was found that had passed unobserved. Died of an acute septic intoxication.

EXPERIMENT 24.

Nov. 2. Mongrel. Weight, 32 lbs. Shot with a S. & W. pistol, .22 calibre. Ball entering two inches to the right and on a level with the umbilicus ranging obliquely upward. Laparotomy revealed slight hæmorrhage a broad non-perforating wound of the intestine and a wound of the mesocolon involving a large vessel. The vessel was ligated and the intestinal wound treated with Lembert stitches, which arrested the hæmorrhage from its edges. The cavity was flushed, mopped out, and closed. Given an injection of morphia and atropia, and removed in an excellent condition. Operation lasted 1/2 hour.

Nov. 3. Lively, and takes food freely. Will again be referred to in another experiment.

EXPERIMENT 25.

Nov. 5. Full-grown dog. Weight, 49 lbs. Shot with a S. & W. pistol, .22 calibre. The ball entered to the right and above umbilicus, passing in a slanting manner downward toward the flanks. Cavity filled with blood. No intestinal wound. The spleen was of a very large size and lying in front of the intestines protected them from injury. The external surface of spleen received a grazing wound for which splenectomy was performed. The splenic root was ligated with a double ligature, but additional ligatures were required to arrest the hæmorrhage. Cavity was flushed, mopped out and closed. Given fifteen minims Magendie's solution and whisky hypodermically and in a condition of shock removed to a warm place. Operation lasted 1 hour. Reaction very slowly ensued.

Nov. 6. Drank a few ounces milk, but very weak.

Nov. 7. Found dead this morning.

Post-mortem. Abdominal cavity contained about a pint of bloody fluid and clots. Ligatures apparently intact. Splenic stump covered with clots.

Death from recurring hæmorrhage.

EXPERIMENT 26.

Nov. 12. Full grown mongrel. Weight, 44 lbs. Shot with a S. & W. pistol, .22 calibre. Ball entered to the right and below the umbilicus, passing obliquely downward. Laparotomy revealed considerable hæmorrhage and fæcal extravasation, four perforating wounds of the intestines and a grazing wound of the spleen. Intestinal wounds closed with Lembert stitches. Splenic wound treated with a running suture; clots removed, cavity flushed, mopped out, and closed. Given fifteen minims Magendie's solution and whisky hypodermically, and removed, in a condition of shock, to a warm place, and external heat applied. Operation lasted nearly 1 hour. Reaction in 2 hours.

Nov. 13. Refuses food, and lies in a quiet manner with retracted belly and an occasional groan. Temperature, 101°, respiration 20. Given twenty minums Magendie's solution.

Nov. 14. Died this morning.

Post-mortem, several hours after death. Cavity contained about a half pint of bloody fluid. Intestines distended with gas and adherent. Intestinal wounds all sealed, excepting one which allowed the escape of fæces; splenic wound covered with lymph. The mesocolon contained a large rent which involved several small vessels. The dog was very old, which accounted for the ease with which the tissues tore. Death from an acute septic peritonitis.

EXPERIMENT 27.

Nov. 12. Full grown black dog. Weight, 41 lbs. Shot with a S. & W. pistol,

.22 calibre. Ball entered below and to the right of umbilicus. Laparotomy revealed the ball lodged immediately under the peritoneum, having failed to enter the peritoneal cavity. Shot a second time, the ball entering at about the same place. Cavity soon filled with blood, which was found to come from a mesenteric artery. The vessel ligated and the examination continued. Eight perforations were found in the intestines. Intestinal wounds closed with Lembert stitches. Cavity flooded and mopped out. The operation lasted nearly 1 hour. Extravasation of liquid fæces occurred. Given ten minims of Magendie's solution and whisky, hypodermically, and removed in an excellent condition.

Nov. 13. Lively and took several ounces of milk.

Nov. 14. Same.

Nov. 22. Continued in good condition up to his escape from the hospital. Recovered.

EXPERIMENT 28.

Nov. 16. Full grown black mongrel. Weight, 40 lbs. Shot with a S. & W. pistol, .22 calibre. Ball entered on a level with and to the left of umbilicus. Laparotomy revealed considerable hæmorrhage, eight perforating intestinal wounds, two of which involved the mesenteric border, a wound of the spleen and one of the mesentery, involving a vessel. The mesenteric wound was treated with a ligature. Wound of the spleen closed by a running suture upon both sides. Lembert sutures were used to close the intestinal wounds, excepting those on the mesenteric edge, which were closed by the continued suture, drawing up a loose fold of the mesentery near the intestinal border to assist in the closure. Cavity flushed and closed. Given ten minims of Magendie's solution and whisky, hypodermically. Removed to the kennel in a good condition. Operation lasted 1 hour.

Nov. 17. Refuses food and lays about in a drowsy manner. Evening temperature, 101.5°.

Nov. 18. Same.

Nov. 19. Temperature, 102°; still refusing food and indifferent to everything. Late in the evening, the dog in a very much depressed condition was again placed upon the table, and after stimulation with whisky and digitalis, again opened. The cavity contained about a half pint of purulent fluid, which was carefully mopped out; intestines highly inflamed and fragile. Several small non-perforating rents near the mesenteric border had ulcerated through. These were closed by the Czerny Lembert suture; the cavity flushed with a hot 1:10000 solution of bichloride, and mopped out. This was repeated with hot sterilized water, and again mopped out and closed. Operation lasted 1 hour.

Nov. 20. Found dead.

Post-mortem. Abdominal cavity contained about three ounces of purulent fluid. Intestines matted together with adherent omentum. Spleen marked with a dark spot beneath the suture. In the left hypochondriac region was found a small sponge, enclosed in a pocket formed by the adherent intestines and omentum which was overlooked in the first operation. The end was largely determined by the cold room during the night. Death from septic peritonitis.

EXPERIMENT 29.

Nov. 23. Medium sized mongrel. Weight, 36 lbs. Shot with a S. & W. pistol, .22 calibre. Ball entered one inch below and three inches to the left of umbilicus.

Laparotomy revealed a moderate amount of hæmorrhage, two perforating wounds of the uterus, and one of a ligament of the uterus, seven perforating intestinal wounds and one of the spleen. The uterine wounds were closed with a continuous suture. The splenic wound was sewed upon both sides with the continued stitch The intestinal wounds were close together and were all removed in a resection of 12 inches, the ends being united after the manner of Wölfler. The site of the resection was reinforced by an omental graft, cavity flushed, mopped out and closed. Fæcal extravasation occurred. Operation lasted 1½ hours, and when completed the dog was suffering severely from shock. Given ten minims of Magendie's solution and whisky hypodermically, and removed to a warm place and external heat applied. Reaction followed in about 2 hours.

Nov. 24. Refuses food, but appears lively otherwise.

Nov. 25. Improving; took several ounces milk.

Nov. 26. Improving; fed upon milk and finely chopped meat.

Nov. 27. Refuses food and appears drowsy, vomiting at intervals; takes water freely, which he soon vomits. After stimulation abdominal section was again performed. The resection was again brought to view, and found to be in an obstructed condition from an enterolith. The proximal end of the united gut was very much distended, and the gut in the vicinity in an inflamed condition. The pressure within being sufficient to cause partial separation, another resection of six inches was performed, the cavity washed out and closed. Given whisky hypodermically and removed to a warm place in a condition of shock, from which he died. Like in the other, the end was largely determined by the cold room.

Post-mortem. Cavity clean, and resection unchanged.

EXPERIMENT 30.

Nov. 23. Very large black mongrel. Weight, 60 lbs. Shot with a S. & W. pistol, .32 calibre. Laparotomy revealed a slight hæmorrhage and three large perforating intestinal wounds, which were closed with Lembert stitches. Cavity mopped out and closed. No fæcal extravasation. Operation lasted nearly an hour. Given five minims of Magendie's solution and two hypodermics of whisky, and removed in an excellent condition. Reaction prompt.

Nov. 24. Appears sleepy. Vomited a half pint greenish fluid. Refused milk.

Nov. 25. Very much improved. Eats well and appears lively.

Nov. 26. As lively as before the operation.

Nov. 27. Same.

Dec. 14. Recovered. Killed to obtain specimen.

Post-mortem. An extensive peritonitis had occurred with adhesions to the omentum and the neighboring coils.

EXPERIMENT 31.

Nov. 23. English bulldog. Weight, 34 lbs. Shot with a S. & W. pistol, .22 calibre. Ball entered one inch to the left and below the umbilicus. Laparotomy revealed considerable hæmorrhage, nine perforating wounds of intestine and a wound of spleen. Several of the intestinal wounds were on the mesenteric border, and closed with a continuous suture. The remaining wounds were closed with Lembert stitches. Splenic wound closed on both sides with a continuous suture. Cavity sponged out, flushed and closed. Operation lasted over an hour. Extravasation of liquid fæces. Hypodermic of Magendie's solution and whisky, and removed to a warm place in a condition of shock. Reaction occurred in 2 hours.

Nov. 24. Very weak and refuses food.

Nov. 25. Took several ounces milk.

Nov. 26. Improving. Fed upon meat and milk.

Dec. 9 Same.

Dec. 19. Recovered and reclaimed.

EXPERIMENT 32.

Nov. 23. Full grown black mongrel. Weight, 40 lbs. Shot with a S & W. pistol, .22 calibre. Ball entered three inches below and to the left of umbilicus. Laparotomy revealed six perforating and two non-perforating intestinal wounds, two wounds of the mesentery involving mesenteric vessels. The vessels were ligated in the mesenteric wounds and the perforating intestinal wounds closed with Lembert stitches. The non-perforating wounds were left untouched. Cavity was flushed and closed. Operation lasted about 1 hour. Fæcal extravasation. Given ten minims Magendie's solution and whisky hypodermically, and removed to a warm place.

Nov. 24. Very weak and refuses food.

Nov. 25. Gait unsteady, took a few ounces milk.

Nov. 26. Refuses food and appears listless.

Nov. 27. Very weak and refuses food. Appears suffering from septic poisoning. Stiches were cut, which allowed the wound to gap, and the escape of thick creamy pus.

Nov. 28. Very weak and emaciated. Refused milk but took some finely chopped meat.

Nov. 29. Improving; takes meat.

Nov. 30. Same.

Dec. 2. Lively and eats well.

Dec. 14. Perfect recovery. Killed to obtain specimen.

Post-mortem. The abdominal wound closed by granulation partly, and partly by the coils of intestines, which were covered externally by a layer of granulation tissue leaving in the abdominal wall a broad and depressed scar. The intestines were firmly and closely bound together, and to the abdominal parietes.

EXPERIMENTS UPON GUNSHOT WOUNDS WITHOUT OPERATIVE INTERFERENCE.

EXPERIMENT 33.

Sept. 30. Medium-sized English bull. Weight, 30 lbs. Shot with a S. & W. pistol, .22 calibre. Given ten minims Magendie's solution and allowed to come from under the anæsthetic.

Oct. 1. Refuses food and lies huddled together as if too weak to stand.

Oct. 2. Found dead some distance from his house.

Post-mortem. Abdominal cavity contained a small amount of thick fluid. Intestines matted together with the omentum adherent. There were two perforating wounds in the small and two in the large intestines, each of which were discharging a thick yellowish-red creamy fluid. In addition there were two more perforating wounds of the intestines. Death from septic peritonitis.